

2000 HERD UNIT CLASSIFICATION OF ROOSEVELT ELK IN REDWOOD NATIONAL AND STATE PARKS (RNSP)

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INTRODUCTION

Historically, Roosevelt elk (*Cervus elaphus roosevelti*) were endemic to the redwood forest ecosystem in northwestern California. Prior to settlement by early American citizens in the 1850's, the Native Americans hunted Roosevelt elk, with minimal impact to the elk population. In addition, the Chilula Indians burned the prairies of the Bald Hills regularly, probably in order to make food and plant material gathering easier for the tribe, and promote grass growth to attract wildlife (i.e., elk and deer). However, from 1848 to 1855 market hunting for elk hide and meat to supply gold miners during the northern California gold rush significantly reduced elk populations and distribution (USDI 1983). When the gold rush was over, settlement began and a great deal of elk habitat was burned or logged and converted for ranching cattle and sheep, and crop land use.

The only elk populations that persisted through this period were those occupying coastal lowlands in the northern part of coastal California, where dense forests and brush fields provided protective cover. Although elk persisted in areas which now comprise Redwood National and State Parks (RNSP), there are no reliable population estimates from the early part of the 20th century. More recently, Mandel and Kitchen (1979) estimated the elk population to be 1,000 to 1,300, with roughly half being located in and around RNSP. Redwood National and State Park's long-term goal for resource management is to restore and maintain the park's natural ecosystem as it would have evolved without human technology. This includes restoring elk herds to pre-settlement numbers and distribution and maintaining the population in equilibrium with the environment, regulated by habitat, predation, inter- and intra-specific competition and natural events.

Annual classification data of Roosevelt elk in Redwood National and State Parks has been undertaken since 1996 (Wallen 1997), in an attempt to document relative abundance and simple population characteristics, such as recruitment and calf survival within known herds. While long term monitoring such as this helps managers understand basic elk population dynamics within the park, it is not intended to replace more detailed investigations and research of the Roosevelt elk population within the park.

METHODS

During 2000, most of the elk classification counts during the spring and summer months (March-August) were conducted opportunistically by the Fish and Wildlife Branch staff while performing field surveys for other species. Field visits to herd areas

from October through December were generally scheduled bi-weekly for classification counts. The elk classification counts were concentrated on 7 identified herd units (see below). Classification counts were performed by driving or hiking to the identified herd units, and also surveying historic and suspected areas where elk have congregated throughout the park. Using binoculars and spotting scopes, observers reported the total number of elk observed, and also the total number of elk within each classification group (see below). The observers also assigned an observation ranking criteria value to the classification count, identifying the observer's confidence in the count data (see below). Other RNSP staff and visitors also opportunistically reported elk counts at known herd units, and elk sightings in lesser or unknown elk use areas.

Herd Units

The herd units included in classification counts were as follows:

- (1) **South Operations Center (SOC)** herd
- (2) **Lower Redwood Creek** herd
- (3) **Bald Hills** herd(s); (dispersed, several discrete herds)
- (4) **Davison Ranch/Berry Glen** herd (considered the same herds)
- (5) **Elk Prairie/101 Bypass** herd (considered the same herds)
- (6) **Gold Bluffs Beach** herd(s); (dispersed, several discrete herds)
- (7) **Crescent Beach Education Center (CBEC)** herd

Classification Groups

Elk herds are classed into groups by age and sex:

- **Cows** = all females >1 year old.
- **Calves** = young of the year (<1 year old; recognized early by spotted coat and small size; later the spots disappear, but they retain a short, rounded snout.)
- **Spikes** = year old males exhibiting only a main beam, brow tine absent.
- **Mature bulls** = ≥ 2 years, with brow tine evident off the main beam.

Observation Ranking Criteria

Rating criteria are used to evaluate the classification conditions and the observer's confidence in the count data:

- 1 = Good**, visibility good and animals close enough to observe with high confidence accuracy.
- 2 = Fair**, animals are either distant or not fully cooperative for good confidence in classification (e.g. observation time is reduced due to movement into cover).
- 3 = Poor**, animals too far away (e.g. difficult to track individuals or animals are in adjacent hiding cover). Qualify the observation in the notes section.
- 4 = Unacceptable**, bad visibility due to darkness, fog, uncooperative animals.

RESULTS

Classification counts were performed to determine the total number of elk within each herd unit, and also the total number of elk within each classification group (Table 1). That data was used to determine ratios of calves/cows (Table 2), and bull/cow ratios.

The ratio of calves to cows is used as an indication of herd productivity (e.g., more calves produced indicates a healthy herd).

Table 1. Highest number of elk reported within each herd unit and for each classification grouping during 2000 (with average count ; standard deviation). MB= mature bull, SP= spike, CW= cow, CV= calf, n= total number of counts reported with ranking criteria <3.

Location	MB	SP	CW	CV	Total	n
SOC	8(2;1.8)	2(1;0.5)	13(11;2.5)	2(2;0.7)	25(14;3.9)	16
Redwood Creek	6(4;1.7)	3(2;0.8)	38(30;4.7)	7(4;1.9)	54(37;8.8)	7
Bald Hills	4(2;1.4)	8(6;2.3)	104(37;34)	15(5;4.1)	131(42;40.6)	13
Davison Ranch	15(4;4.2)	8(3;2.0)	39(29;5.9)	11(5;2.9)	73(39;8.0)	21
Elk Prairie	1(1;0.0)	4(2;0.9)	20(12;4.9)	5(3;1.3)	30(16;6.7)	17
Gold Bluffs Beach	5(2;1.5)	2(2;0.7)	29(11;9.8)	4(3;1.3)	40(12;9.5)	12
CBEC	2(2;0.6)	1(1;0.0)	16(15;0.8)	2(2;0.0)	21(15;4.9)	6

Table 2. Calves per 100 cows for identified elk herds, 1996 to 2000.

Location	1996	1997	1998	1999	2000
SOC	45	35	29	31	15
Redwood Creek	39	11	15	38	22
Bald Hills	25	20	32	32	14
Davison Ranch	23	27	18	23	41
Elk Prairie/Bypass	8	33	24	53	25
Gold Bluffs Beach	N/A	38	12	7	9
CBEC	N/A	N/A	N/A	N/A	13

South Operations Center (SOC) herd

The SOC herd was almost always observed on the small grassland in front of the administrative buildings. The highest possible number of elk in this herd was 25. Only 2 calves were observed during 2000, and the bachelor bull herd usually ranged from 7 to 8 bulls. The calf/cow ratio using the 2 observed calves and the highest cow count was 0.15. The bull/cow ratio was 0.65, which is considered high, even for unhunted elk. The F&W Branch received 2 reports of injured bulls near the SOC herd, that presumably sustained injuries from jumping the fence between private pastures and NPS land. One bull broke its jaw and starved to death and the other had a broken or dislocated right front leg and was dispatched by CDFG.

Lower Redwood Creek herd

This herd was difficult to observe until they began to use the levee above Redwood Creek (late summer into fall). The calf/cow ratio for this herd was 0.22 and the

bull/cow ratio was 0.16. The highest possible number of elk in this herd was 54. There were fewer calves seen this year, while the number of bachelor bulls was comparable to last year. It is unknown how far up or down Redwood Creek the herd travels. This herd does cross the fence along the levy to gain access to private pasturelands and the rodeo grounds north of Orick, and has been reported to move down Redwood Creek to graze within Orick during winter.

Bald Hills herd

The elk in the Bald Hills seem to be comprised of several discrete herds which have been observed near Ganns Prairie, Elk Camp, Airstrip, Childs, and Maneze Prairies, Coyote Creek, and the Williams Ridge area. There were 2 reports of an elk herd of 121 in Coyote Creek during January of 2000. The second largest herd size was reported at 85 animals in the Schoolhouse Peak area. A herd of approximately 25 was often observed at Elk Camp prairie. The calf/cow ratio for the combined herds within the Bald Hills was 0.14 and the bull/cow ratio was 0.04. These ratios are representative of herd health throughout the Bald Hills and do not necessarily reflect conditions within sub-herds. The extremely low number of bulls observed in the Bald Hills is likely due to habitat (e.g. plenty of second growth and old growth redwood and oak woodlands to hide in), human presence (e.g. receives some poaching pressure and hunting in adjacent lands outside park), and the sightings of very large cow groups, rather than a true lack of bulls.

Davison Ranch / Berry Glen herd

This elk herd is one of the most visible and easily accessible herds in the park. Therefore, classification counts were typically conducted under good visibility (e.g. the elk were in the open meadow) and the animals were often close enough to observe with a high confidence in accuracy. The herd typically consisted of a group of mature bulls that occupied the northern portion of the meadow, and a separate group of cows, spikes, and calves that occupied the southern portion of the meadow. This herd produced a large number of calves this year. Eleven calves were observed with the herd on 28 June, and three cows were acting like they had calves hidden in the prairie. The highest possible number of elk in this herd was 73, and the calf/cow ratio was 0.41. The bull/cow ratio was 0.21, with 15 mature bulls observed during several of the counts. A sick cow died in the spring, a bull was hit and killed along the highway 101 near Lost Man Creek road and another cow carcass was found in Elk meadow.

Elk Prairie / 101 Bypass herd

The Elk Prairie herd is another highly visible and easily accessible elk herd within the park. The highest possible number of elk in this herd was 30. However, most sightings ranged from 15-20 animals total. The calf/cow ratio was 0.25, with five calves observed in December. The bull/cow ratio was 0.05 bulls, with only 1 bull observed during counts. These elk were often observed grazing along the shoulder of the highway 101 bypass when they were absent from Elk Prairie, and 1 cow mortality was recorded along the 101 bypass during 2000. This herd continues to shift some of its activity to the southern portion of the Highway 101 Bypass, foraging along the cut and fill slopes south of the summit. The elk appear to start using the right of way along highway 101 after their breeding season (November through the winter months). However, elk have been

reported along the bypass during the summer months. Elk have also been observed north of the summit, but it is unknown if they are the same elk that occupy Elk Prairie.

Gold Bluff Beach herd

Similar to the bald Hills herd, The Gold Bluffs Beach herd seems to be comprised of several discrete herds which have been observed from Mussel Point to the Carruther's Cove area. The dispersal of animals throughout the approximately 10+-mile beach strand makes even finding the sub-herds and bachelor herds difficult. This years counts were usually obtained while performing other field duties, such as snowy plover surveys or carcass counts, from April through September. However, the most consistent sightings of a large herd occurred near Ossagon Rocks. The highest possible number of elk in this herd was 40 with a calf/cow ratio of 0.19 and a bull/cow ratio of 0.17. The low ratio of calves/cows is similar to last year but may be due more to a lack of quality observations and limited time spent counting the herd(s). Small groups (<5) of elk or elk tracks were sometimes observed south of Major Creek during plover and carcass surveys. There have been reports of a small herd of elk that reside south of Mussel Point.

Crescent Beach Education Center herd

This was the first year we listed classification data for this herd. The Crescent Beach Environmental Center (CBEC) staff reported their elk observations whenever the animals foraged near the center. They typically were observed infrequently by NPS employees at the Crescent beach Education Center, grazing on the lawn. The highest possible number of elk in this herd was 40 with a calf/cow ratio and a bull/cow ratio of 0.13. No bachelor bull herds have been observed in the CBEC area.

Other

Small groups of elk were reported in other areas of the park. For example, several bulls were observed at the far east end of the Aubell facility, and other individual sightings occurred. Elk have also been reported along coastal drive near Flint Ridge and as far south as the California state prison/CDF Alder Camp. Biologists also observed a large group of elk north of Carruther's Cove (a bull with 12 cows and 4 calves was observed from the overlook on Coastal Drive) which is mostly likely the original North Beach or Coastal Drive herd.

MORTALITY

Hunts on adjacent lands

California Department of Fish and Game has allowed hunting of the Del Norte and Klamath elk herds for several years. The Del Norte elk herd area occurs to the north of Jedediah Smith State Park, between the park and the Oregon Border. The state awarded 15 tags (10 bulls, 5 cows) to be hunted from 29 August through 10 September 2000. Eight bulls and 4 cows were harvested during this special hunt. Stimson Timber Company also used a landowner permit for single bull. The Klamath elk herd area covers the commercial timberlands south of Klamath, CA, and lies between the Klamath river and RNSP. The state awarded 30 tags for either sex to be hunted from 6 September through 17 September 2000. Only 3 bulls and 1 cow were harvested. The Big Lagoon

herd, south and west of Redwood National Park was hunted for the first time this year, with excellent hunter success. The Big Lagoon hunt area covers Simpson Timber Company lands south of RNSP to Highway 299. The state awarded 25 tags for either sex to be hunted from 20 August through 10 September 2000. The hunters tagged 18 bulls and 2 cows. Simpson Timber Company also used a landowner permit for single bull.

Elk mortality that was reported to RNSP is summarized below (Table 10). Mountain lions also accounted for at least 3 elk deaths within the parks (C. Arguello, personal comm.). Cal Trans also proposed to construct a median barrier in 2001, on the southern end of the Highway 101 Bypass around Boyes Creek, from milepost 127 to 131, to reduce crossover vehicle accidents. While they are expected to leave several designed openings in this barrier, it is uncertain how well either the gaps or the barrier will accommodate the elk herds that graze the cut and fill slopes along highway 101.

Table 10. Roosevelt Elk mortality observed in RNSP in 2000.

Location	Observer	Date	M B	S P	C W	C V	Tot	Notes
Davison Ranch	Holm	5/15			1		1	Sick with scours (5/11), died by 5/15 in north Elk Meadow
Fern Canyon	Rovai	5/15	1				1	Dead bull in Fern Canyon
Barlow's field	Mattison	6/26					1	Bull with broken jaw
Davison Ranch	K. Fuller	7/14	1				1	Hwy 101, Lost Man Creek
Davison Ranch	Reed	8/8			1		1	Dead cow carcass in Elk Meadow south of road
101 bypass	Roberts	11/6			1		1	Injured cow killed.
SOC – Barlow's field	Albert – CA F&G	12/8	1				1	Killed injured bull and removed carcass
TOTALS			4	-	3	-	7	

DISCUSSION

Harper et al (1985) reported that calf/cow ratios for Roosevelt elk in Oregon average 0.39 (range = 0.32 to 0.47). The Oregon estimates were from herd units that were subject to hunting mortality. In a late 1970's RNSP study, Mandel and Kitchen (1979) reported the approximate calf/cow ratio at 0.20. The calf /cow ratios reported for the identified elk herds within RNSP during 2000 ranged from 0.09 to 0.41, with all but 1 herd below 0.30. It is difficult to make meaningful comparisons of calf/cow ratios per herd from year to year due to the variability in sampling. The fact that observability of many herds is difficult and variable numbers of sample counts indicate that current ratios may not accurately reflect real changes in calf production.

One of the greatest difficulties of obtaining accurate classification counts in RNSP is revealed in counts of Bald Hills and Gold Bluffs Beach herds. These areas are relatively large geographic units, and elk can be dispersed throughout these areas within sub-herds during the late summer and fall. The herds begin to group together in winter, when the calves have grown larger and are harder to differentiate from yearling cows.

Combining the data from all observations in these areas does not provide a truly accurate cow/calf ratio, however it may be an accurate estimate of particular sub-herds when they are located.

The herds at SOC, Davison, Elk Prairie/Bypass and lower Redwood Creek areas tend to group together in more discrete units, making cow/calf ratios easier to determine. These herds tend to be more habituated to humans, so observations are often more reliable. The Gold Bluffs herds are relatively habituated, and observations can be made of individual groups; however, their dispersal throughout the beach corridor makes it difficult to ascertain discrete units. The Bald Hills herds undoubtedly receive some poaching pressure, making them difficult to observe for any length of time. The adjacent commercial timberlands are also open for hunting for 10 days in September, which appears to send park herds to remote prairies.

Estimates of the total number of elk within RNSP range from 200-600. We documented a minimum of 374 elk within park boundaries during 2000. There were likely a substantial number of elk present within the park that we never observed. Because classification count surveys were not intended to account for all elk within the park, we can only provide a minimum count of elk inhabiting the park annually.

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